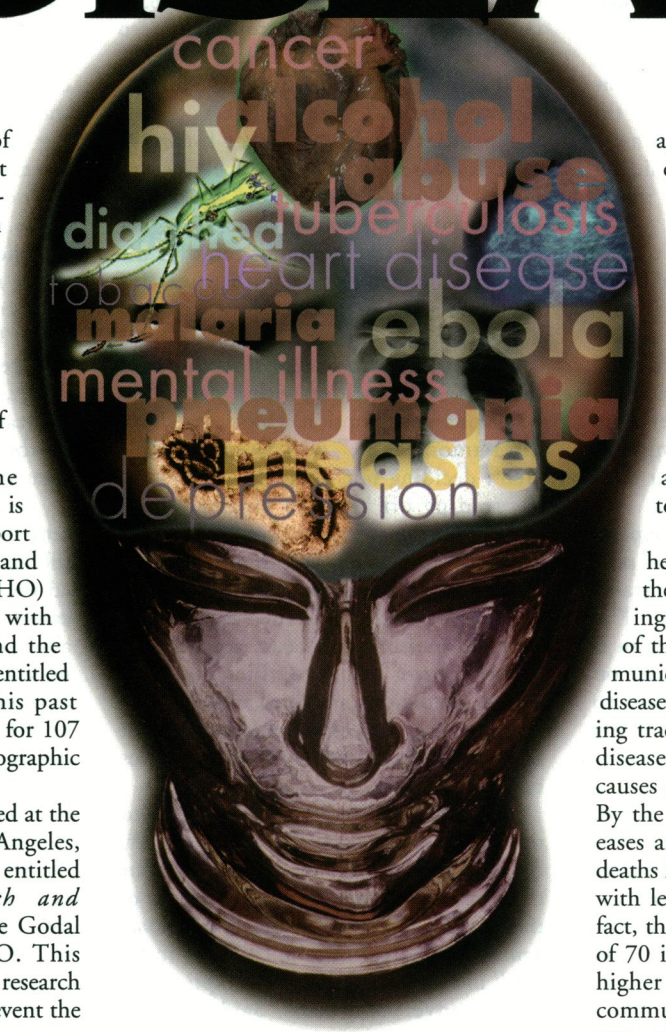
THE FUTURE FACE OF DISEASE



If the world heeds the warnings of public health policy expert Christopher Murray and the constructive advice of economist Dean Jamison, the health of the planet's population may look very different in 25 years than what is currently projected. Murray and Jamison have issued a call to action based on their novel, comprehensive models of the future of global health.

Murray, a physician at the Harvard School of Public Health, is coauthor of a groundbreaking report on international health. Murray and World Health Organization (WHO) researcher Alan Lopez, working with more than 100 colleagues around the world, issued a 10-volume report, entitled *The Global Burden of Disease* this past summer. The report, looks at data for 107 diseases, calculated for eight demographic regions by age, sex, and cause.

At the same time, Jamison, based at the University of California at Los Angeles, helped draft a companion report entitled *Investing in Health Research and Development*, coauthored by Tore Godal and James Tulloch of the WHO. This report describes actions, especially research funding, that could be taken to prevent the realization of Murray's predictions.

The Global Burden of Disease, by all accounts, is a sweeping, ambitious, one-of-a-kind effort. Jamison's report builds on that report's predictive analysis. Together, they offer a perspective that Murray hopes will turn traditional health policy on its head.

Microbes or Modern Stress

Murray and his team have gone beyond the conventional world outlook on disease. Public opinion, as well as that of many scientists, is that the future health of the world will be primarily characterized by a war against lethal microbes—a struggle against the mounting number of deadly diseases emerging from nature as witnessed by the worldwide spread of HIV, the resurgence of tuberculosis, the specter of Ebola, the blooming spread of hantavirus, and the growing alarm over drug-resistant microbes. But Murray's group found that the top emerging threats to world health are heart disease—a longtime scourge of modern society—and severe depression, an almost totally unacknowledged ailment.

In painting a portrait of how the health of the world will look in 2020, the group found that in the developing world, where approximately 80% of the global population lives, noncommunicable diseases such as cancer, heart disease, and mental illnesses are fast replacing traditional enemies such as infectious diseases and malnutrition as the leading causes of disability and premature death. By the year 2020, noncommunicable diseases are expected to account 70% of all deaths in the developing regions, compared with less than half of all deaths today. In fact, the scientists say, adults under the age of 70 in sub-Saharan Africa already face a higher probability of death from a noncommunicable disease than adults of the same age in the most developed countries.

Death and disability due to the traditional problems of developing nations, including communicable, maternal, and perinatal conditions and nutritional deficiencies, are estimated to decline from 17.2 million cases in 1990 to 10.3 million in 2020, according to the group's report, due

to progress in fighting these conditions and education of the world's youth. This projected reduction "runs counter to the now widely-accepted belief that infectious diseases are on the ascent worldwide," Murray said.

Among its findings, the report says that what will be a virtual epidemic of noncontagious disease will be brought on largely by tobacco and alcohol abuse. By 2020, the researchers predict, tobacco-related illnesses are expected to kill more people—8.4 million a year—than any single disease, surpassing even the HIV epidemic, with most of the increase occurring in the developing world.

By measuring disability, the report depression would be elevated to the second largest global health problem in the 2020s. Depression affects 1.2% of the global population, but death rates from it are low. Factor in disability, however, and depression counts for almost 11% of the burden of disease worldwide, Murray says. "The magnitude is tremendous," he said. "It's an unrecognized health policy issue even today."

Behind the shifts in disease burden is the rapid aging of the developing world's population. As a population's birth rate falls, the number of adults relative to children increases, and the population's most common health problems become those of adults rather than those of children. In China and some other parts of Asia, as well as in Latin America, this so-called "epidemiological transition" is much further advanced than many public health specialists appreciate, according to Murray.

Perhaps most taken aback by the report's results were the researchers themselves. "We were stunned. I never would have believed this starting out, and I was very skeptical when the first numbers, especially on depression, were revealed," said Murray. "So we checked and double-checked."

The report surprised the public health policy community because its conclusions are based on a new approach to measuring health status: it used a limited number of death certificates and extrapolation from clinical studies and health databases to quantify not only the number of deaths but also the impact of premature deaths and disability on a population. These figures were then combined into a single unit of measurement of the overall burden of disease called a "disability-adjusted life year," or DALY. The study also took into account risk factors for disease, including tobacco, alcohol, poor water and sanitation, and unsafe sex.

Road Map

The value of *The Global Burden of Disease* is that it gives governments that have lacked even the most basic data some guidance in allocating scarce monies, including research funds and health care costs, Murray said. "It's like a road map. You've got to know where you are to get someplace else."

Offering to help steer the process in new directions is Jamison, whose report suggests ways to coordinate the current fractured and fractious health research efforts toward addressing Murray's predictions. Jamison's report is, however, grimly realistic regarding the magnitude of that challenge.

While *The Global Burden of Disease* identifies a major new research agenda for noncommunicable diseases, there remains the unfinished business of the problems that have plagued the world to date, particularly infectious diseases and those that affect maternal and child health. There is neither the money nor the will to devote to these problems, Jamison says. No government, whether developed or developing, spends more than 5% of its total domestic health spending on research, which the authors say has led to "acute neglect of the needs of poorer populations." In 1992, research claimed just 3.4% of the world's total expenditure on health, according to *Investing in Health Research and Development.* Of a total of almost $56 billion invested in health research in 1992, Jamison estimates that 95% was invested in health problems that primarily concern the industrialized world, and just 5% was devoted to the health needs of developing regions. For example, combined research and development spending on the three currently leading conditions in developing nations—pneumonia, diarrheal disease, and tuberculosis—totaled just $133 million, or 0.2% of the world's total health research and development spending. "Yet, between them, these diseases make up almost one-fifth of the global disease burden," the report states. Jamison concludes that the inability of the international health community to allocate research and development resources to the most debilitating global health problems "has deepened as political will to support health research has faltered."

Jamison's findings echo a 1990 report by the Commission on Health Research for Development, an independent, multidisciplinary international initiative formed in 1987, which concluded that only 5% of global research is spent to address 93% of the years of potential life lost in the world. The commission's report, entitled *Health Research: Essential Link to Equity in Development* also stated that "institutional change" would be necessary to gather information and facilitate efficient resource allocation on a global basis. To this end, Jamison's report suggested that a kind of global consortium be established to provide a strong and reasoned voice for research allocation, one that would help to identify existing gaps in global health research, particularly those that affect poor populations. The consortium would also help to reduce overlap and waste. This suggested consortium, a "Forum for Investors in International Health Research and Development," would be an alliance of governments, investors, and scientists, and could be created under the aegis of the WHO.

As the demand for health services by more urbanized, educated, affluent, and vocal populations grows, while access to health resources for the most vulnerable populations demands strengthening and preservation, choices on spending will become even harder to make. A forum approach, suggests Jamison, could help to identify the "best buys."

A DALY Dose

Both Murray and Jamison admit they have received mixed reviews on their respective reports from a spectrum of international health professionals. The criticism has focused primarily on the use of the DALY scoring technique. Unlike traditional methods for measuring the total burden of disease, the DALY measures by counting not just numbers of deaths, but by counting days lost to acute disease episodes, chronic disabilities, and premature death. The inclusion of these factors has had a broad impact on disease predictions for 2020. For example, in lists of disease burden developed by Murray's group, some of the current top diseases such as measles, malaria, and iron-deficiency anemia are replaced in predictions for 2020 by currently lower ranking conditions such as HIV, violence, and war. Even within the WHO, the report's sponsoring organization, the DALY has been accused of being "flawed, with no conceptual basis," said Jamison. However, Jamison believes this reaction is largely politically based and that while the DALY may not be perfect, it has been accepted by the public health community at large as the best measurement method available.

Others are not quite as certain of the DALY's value as Jamison. "Some urge that the DALY only be used with caution because it is not a verified, validated tool, [but one] that creates a single measure

based on value judgments, like the idea that a person in their 20s is more valuable than a child or elderly person," said John Bryant, former director of Columbia University's School of Public Health and a faculty member of Pakistan's Aga Khan University. "Others, including myself, see it as a useful method that is early in its development, but which helps assess a global health shift that each country should pay attention to."

"Even if it is all true—and it is hard to doubt that chronic diseases will have a huge impact—we will face resistance in addressing them in significant ways," says Polly Harrison, head of the Forum on Emerging Infectious Diseases at the National Academy of Science's Institute of Medicine. "There is dwindling interest in foreign assistance in general, as well as what has been called 'donor fatigue' in connection with international health overall. Only the needs of children have commanded any constituency and even that is limited."

Murray says that he also has encountered a lot of resistance from certain disease-specific interest groups who, he says, feel that using this type of process limits the way they can present information. For example, Frederick Hartman, a family physician who has worked overseas on United States Agency for International Development projects and is now a board member of Childreach—the U.S. branch of Foster Parents Plan, a child-centered development organization working in 40 developing countries of Africa, Asia, and Latin America—views the results in Murray's report with "healthy skepticism," because the report predicts that childhood diseases of today will not be as "important" in 2020. Says Hartman, "I question what happens to the children in the model. In Africa, all the gains in child survival and maternal child health have been wiped out by HIV, and the problem is growing there and in Asia. The report may be true if a whole group of young adults are eliminated." Hartman also said he doubts that Americans, "who are looking at their own issues," will support a heavy emphasis on international health. Childreach has collected only $30 million in monthly donations to help take care of 1 million children in 40 developing countries. Comparatively, the Netherlands funds half of the organization's $220 million annual budget.

Recognizing that there is widespread reluctance to tackle international health issues, Jamison says he is less optimistic than he was 3 or 4 years ago about the validity of a coordinated body to help direct research efforts. "There is real fragmentation in the health community—squabbles between physicians, who don't want to waste money on research but [who want to] apply available therapies now, and researchers, who opt for better therapeutic solutions in the future," he said.

"But I am also optimistic because I know it can work and has in other areas, such as the successful global effort to coordinate research on agriculture and even tropical disease," Jamison said. "We are at a critical junction now, and we still have to win the battle of getting [a] solid chunk of support for psychiatry, cancer, heart [disease], and smoking research."

Gaining such support may be difficult, says Nobel laureate Joshua Lederberg, president emeritus at The Rockefeller University and an expert in emerging infectious diseases. Lederberg notes that the "authority and appropriations to act internationally have long been severely limited," and that, when prevention is part of the formula in disease control, there "are great psychological impediments to get people to think about protecting their well-being while they are still healthy, and building this into the political and social institutions."

Larry Friedman, director of the Division of Epidemiology and Clinical Application at the National Heart, Lung, and Blood Institute, agrees that such lifestyle changes are very difficult to accomplish but adds that Murray's report has "quantified a lot of things that people have been thinking about." Said Friedman, "The report is persuasive and probably right, but needs more work [in] coming up with better ways to measure the impact." He adds, however, that these criticisms won't stop him from using the report's findings to help boost his budget.

John La Montagne, director of the Division of Microbiology and Infectious Disease at the National Institute of Allergy and Infectious Diseases, notes that any increase in research funding at the NHLBI will also be likely to help his group because disease is now generally recognized as having components that are infectious, genetic, environmental, and behavioral. But La Montagne says that the Murray report is too abstract and calls it "idealistic." He also faults the report for failing to "appreciate that things can change"; for example, that new viruses may arise, and for not recognizing that "breakthroughs in insight can't be planned."

Indeed, U.S. leaders have not been able to agree on a single call to action in addressing diseases, both emerging and chronic. In September, news reports stated that Vice President Al Gore had declared that "there is no more menacing threat to our global health today than emerging infectious diseases." His comment was followed by a public plea from retired army general H. Norman Schwarzkopf, a cancer survivor, for increased oncology research because of continuing rises in rates of cancers in the United States.

At least one major federal agency appears to have acknowledged the conclusions of the reports. The Centers for Disease Control and Prevention has asked Murray to conduct a 3-year analysis of predictions for the United States. "We need to choose where we get the biggest bang for the buck," said James Marks, director of the National Center for Chronic Disease Prevention and Health Promotion.

Marks believes that eventually *The Global Burden of Disease* and *Investing in Health Research and Development* will become quite influential in helping to drive public health policy. "If everyone could accept something like this, it would help rationalize decision making," said Marks, by helping policy experts and medical researchers plan for the future. Jamison hopes health policy experts will adopt the views of his report and use this information to plan the way that agricultural researchers in past decades successfully planned and initiated global agricultural programs. "With a division of labor and a sharing of results, it can be done," Jamison said. "We just have got to try."

Renee Twombly